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PSYCHROMETRIC TABLES.

In the MONTHLY WEATHER REVIEW for August, page 333, Mr. W. H. Alexander states that Molesworth's psychrometric tables were used by his correspondents in reducing their observations of the wet and dry bulb thermometer. In reply to an inquiry by the Editor, Mr. Alexander states that he has not been able to find a copy of these tables in St. Kitts, but has obtained a manuscript copy of the table actually used under Mr. Watts's direction. This is copied from Hurst's Handbook for Surveyors, and is identical with the tables of dew-point factors published by Glaisher in 1856, and which the reader will find reprinted on page 144 D of the Smithsonian Meteorological Tables, third edition, 1859. These factors are still used by English observers, and, in some cases, give approximate results if the psychrometer is not ventilated or exposed to a strong wind. In order to obtain the best results with the psychrometer, it must be ventilated at the rate of 5 to 10 feet per second and the corresponding tables first prepared by Ferrel and slightly amended by Assmann, Svensson, Marvin, and others must be used.

OBSERVATIONS DURING THE SOLAR ECLIPSE.

The observations at one hundred and fifty-four meteorological stations in India recorded during the solar eclipse of January 22, 1898, have been discussed and published by Mr. John Eliot, the Director General of Indian observatories, in a recent Indian meteorological memoir. The observations included the temperature of the air, barometric pressure, relative humidity, cloud and rainfall at all stations and solar radiation observations at six stations. The solar radiation thermometer is so much affected by the radiation from the surrounding inclosure and by the wind, as well as by its own sluggishness, that it must not be considered as an instrument for measuring solar radiation proper, but may, possibly, give us a fair indication of the changes in temperature of leaves and other objects exposed to the sunshine. The difference between the readings of the solar radiation thermometer and the dry bulb or air temperature in the shade, were directly proportional to the area of the unobscured portion of the disc of the sun. The temperature of the surface of the ground was observed in isolated cases; the amplitude of the change in the interior of India was from 12° to 20° at the time of maximum obscuration. The temperature of the air diminished in proportion to the obscuration and amounted to 8° in the interior of India near the path of total eclipse. The maximum reduction of temperature was 12° at Karwar and the epoch of the greatest diminution of temperature averaged about twenty-three minutes later than the epoch of greatest obscuration. Mr. Eliot suggests that this large amount of retard may have depended somewhat upon inaccurate observations in the dim eclipse light, but it was practically the same over the whole area in which the sun's disc was obscured by eight-tenths or more. With regard to the barometric pressure Mr. Eliot states that there was a steady increase of pressure proceeding at a nearly uniform rate during the first stage of the eclipse; there was little or no variation during the second stage and, finally, during the restoration of sunlight an increase of pressure that continued after the termination of the eclipse.

The chief effects of these actions were (*a*) to decrease the amplitude of the diurnal variation on the day of the eclipse by amounts averaging about 0.035 inches in and near the belt of totality; (*b*), to accelerate the epoch of the afternoon minimum of the diurnal oscillation on the day of the eclipse by intervals averaging about forty-five minutes. The motion of the air was very considerably modified in amount and intensity, but not in direction; it fell off very rapidly during the first stage and was feeble during the greater part of the second stage. Light airs and calms prevailed during the time of greatest obscuration at an hour when the diurnal variation of the wind gives us the greatest velocity. At the majority of stations and near the belt of totality a short sudden gust occurred at twenty minutes after the commencement of the eclipse. This is shown at a large number of stations; the recorded velocity of the gusts varied between 10 and 26 miles per hour; at the first class stations the gust occurred one or two hours before the eclipse at 3 stations, but after the beginning at 10 stations; the gusts show a fairly regular progress from west to east. At twelve second and third class stations, in or near the belt of totality, the gusts occurred before the eclipse in four cases. On the average of all the 38 stations at which anemometers were used the mean air movement between 1 and 2 p. m., was only a third of that which prevailed during the preceding hour, and was even less than the movement in the early morning hours at the time of the diurnal minimum wind. In general, a series of gusts occurred about twenty minutes after the commencement of the eclipse and another series about half an hour after totality. The day was remarkably clear, and the atmosphere steady, and upward convective movements were feeble, more especially during the eclipse, when they were *nil*. There was a large and rapid increase of the pressure of aqueous vapor, and hence also of relative humidity commencing on an average about twenty minutes after totality, followed by an equally large and rapid decrease for about thirty minutes. This oscillation occurred at all stations without exception during the second half of the eclipse and was the most remarkable and unexpected phenomenon of all. The data at hand show clearly that this oscillation in humidity was transmitted from west to east with approximately the same velocity as that of the shadow of the moon; it was not due to an actual horizontal movement of the air, but passed across India with the shadow itself. It could not have been due to the ordinary processes of evaporation or diffusion of moisture, or to the slow horizontal movement of the air, as shown by the anemometer; the only action which could give rise to this oscillation is the descent of masses of air containing a larger quantity of aqueous vapor than the air at the surface. Mr. Eliot considers

that this moist air existed as a stratum a little way above the ground, and that it descended to the earth because of the lower temperature in the eclipse area, as compared with the areas in front and rear.

As the moon cuts off the heat of the sun from the earth and its atmosphere quite rapidly during an eclipse and as totality itself lasts only from one to five minutes, the atmospheric changes as to pressure, temperature, moisture, and wind go on so rapidly, even though they be but slight, that we need very sensitive apparatus in order to measure them accurately. The temperature of the dry and wet thermometers follows the corresponding temperature of the air too sluggishly to be of much value in these delicate researches unless the thermometers are thoroughly well ventilated or whirled. Anemometers are notoriously sluggish. In general, we think that the diminution of the vertical convection current due to the cooling of the ground suffices to explain the diminution of the wind, while the subsequent warming of the ground and renewal of convection currents should explain the gusts that followed. The diurnal variation of the wind must, according to the simplest laws of hydrodynamics, produce a corresponding diurnal variation in the barometric pressure.

LANTERN SLIDES FOR LECTURES.

In order to respond to the increasing demand for lantern slides for the use of Weather Bureau officials in their lectures, the Chief of Bureau has ordered that such be prepared and sent to those who are giving lectures that require such illustrations. Many of the teachers and others who receive the MONTHLY WEATHER REVIEW doubtless have seen or perhaps possess such slides, and the committee appointed by the Chief to make the selection would be glad to hear of any that are esteemed as particularly effective or instructive. Those who desire slides on particular subjects or have any suggestions to make relative to the proposed series are invited to submit their views. It will, of course, require some months to complete the execution of this work.

POGONIP.

In the MONTHLY WEATHER REVIEW for 1894, page 76, the Editor has given some account of that mist or fog of frozen vapor that is called by the Indian name pogonip. It is there spoken of as recurring frequently in the southeastern part of White Pine County, Nev.; but the following item from Ainsley's Magazine, as reprinted in the Washington Evening Star of October 27, 1900, gives further interesting information.

This phenomena occurs most frequently in the northern part of Colorado, in Wyoming, and occasionally in Montana.

About two years ago a party of three women and two men were crossing North Park in a wagon in the month of February. The air was bitterly cold, but dry as a bone and motionless. The sun shone with almost startling brilliancy. As the five people drove along over the crisp snow they did not experience the least cold, but really felt most comfortable, and rather enjoyed the trip. Mountain peaks 50 miles away could be seen as distinctly as the pine trees by the roadside.

Suddenly one of the women put her hand up to her face and remarked that something had stung her. Then other members of the party did the same thing, although not a sign of an insect could be seen. All marveled greatly at this. A moment later they noticed that the distant mountains were disappearing behind a cloud of mist. Mist in Colorado in January. Surely there must be some mistake. But there was no mistake, because within ten minutes a gentle wind began to blow, and the air became filled with fine particles of something that scintillated like diamond dust in the sunshine. Still the people drove on until they came to a cabin where a man signaled to them to stop. With his head tied up in a bundle of mufflers, he rushed out and handed the driver a piece of paper, on which was written: "Come into the house quick, or this storm will kill all of you. Don't talk outside here."

Of course no time was lost in getting under cover and putting the horses in the stables. But they were a little late, for in less than an hour the whole party was sick with violent coughs and fever. Before the next morning one of the women died with all the symptoms of pneumonia. The others were violently ill of it, but managed to pull through after long sickness.

"I saw you people driving along the road long before you got to my house, and I knew you did not know what you were driving through," said the man, as soon as the surviving members of the party were able to talk. "That stuff you saw in the air was small particles of ice, frozen so cold that it goes clear down into the lungs without melting. If one were to stay out a few hours without covering his head he would surely die. One winter about eight years ago a whole Indian tribe across the Wyoming line died from its effects. The Indians are more afraid of it than they are of rattlesnakes, and call it the 'white death.'"

THE LONG RECORD OF MR. S. P. DAVIDSON.

Mr. B. L. Waldron, Observer Weather Bureau, Columbus, Ohio, writes that Mr. Samuel P. Davidson, of London, Ohio, has maintained a complete record of temperature and rainfall, frosts, and snowfall since 1852. The whole record was made by himself, and his thermometers have always hung on the same north porch. Mr. Davidson is now eighty-eight years of age—it is to be hoped that the records will be maintained by others for many years to come.

Mr. Waldron has forwarded to the Weather Bureau some newspaper clippings and data compiled from Mr. Davidson's record, and it is to be hoped that the complete manuscript will be deposited for safe keeping in the fire-proof vaults of the Weather Bureau.

In utilizing such records for the investigation of the question of the secular change of climate one should always remember that thermometers are always changing their zero points, and rain gages are greatly affected by such changes in their surroundings as increase or diminish their exposure to the wind. Even the records of frost will vary with the nature of the soil and the plant and the sheltering influence of the forests.

THE WEATHER OF THE MONTH.

By ALFRED J. HENRY, Professor of Meteorology.

CHARACTERISTICS OF THE WEATHER FOR OCTOBER.

In many respects the weather of the month was typical of summer conditions. The circulation of the air was generally feeble, temperatures were above the seasonal averages and the rainfall was abundant in the majority of districts. A number of areas of low pressure formed in the Plateau region or moved in from the north Pacific, only to dissipate in the upper Mississippi and Missouri valleys. It was eminently a month of inaction on the part of the lows. Two areas of high pressure of marked character moved across the country. The first appeared over the northern Plateau region on the morning of the 6th, moved to the middle Rocky Mountain region by the morning of the 7th and to the Mississippi Valley by